In [4]:
```
# Author: Olusola Akinbode

%matplotlib inline

import numpy as np
import pandas as pd
import matplotlib as mpl
import matplotlib.pyplot as plt
```

In [5]:
```
data = pd.read_fwf("auto-mpg.data", na_values='?')
```

In [6]:
```
data.columns=['mpg', 'cylinders', 'displacement', 'horsepower', 'weight', '
```

In [7]:
```
data.set_index('car name')
```

Out[7]:

| car name | mpg | cylinders | displacement | horsepower | weight | acceleration | model year | origin |
|---|---|---|---|---|---|---|---|---|
| "buick skylark 320" | 15.0 | 8 | 350.0 | 165.0 | 3693.0 | 11.5 | 70 | 1 |
| "plymouth satellite" | 18.0 | 8 | 318.0 | 150.0 | 3436.0 | 11.0 | 70 | 1 |
| "amc rebel sst" | 16.0 | 8 | 304.0 | 150.0 | 3433.0 | 12.0 | 70 | 1 |
| "ford torino" | 17.0 | 8 | 302.0 | 140.0 | 3449.0 | 10.5 | 70 | 1 |
| "ford galaxie 500" | 15.0 | 8 | 429.0 | 198.0 | 4341.0 | 10.0 | 70 | 1 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| "ford mustang gl" | 27.0 | 4 | 140.0 | 86.0 | 2790.0 | 15.6 | 82 | 1 |
| "vw pickup" | 44.0 | 4 | 97.0 | 52.0 | 2130.0 | 24.6 | 82 | 2 |
| "dodge rampage" | 32.0 | 4 | 135.0 | 84.0 | 2295.0 | 11.6 | 82 | 1 |
| "ford ranger" | 28.0 | 4 | 120.0 | 79.0 | 2625.0 | 18.6 | 82 | 1 |
| "chevy s-10" | 31.0 | 4 | 119.0 | 82.0 | 2720.0 | 19.4 | 82 | 1 |

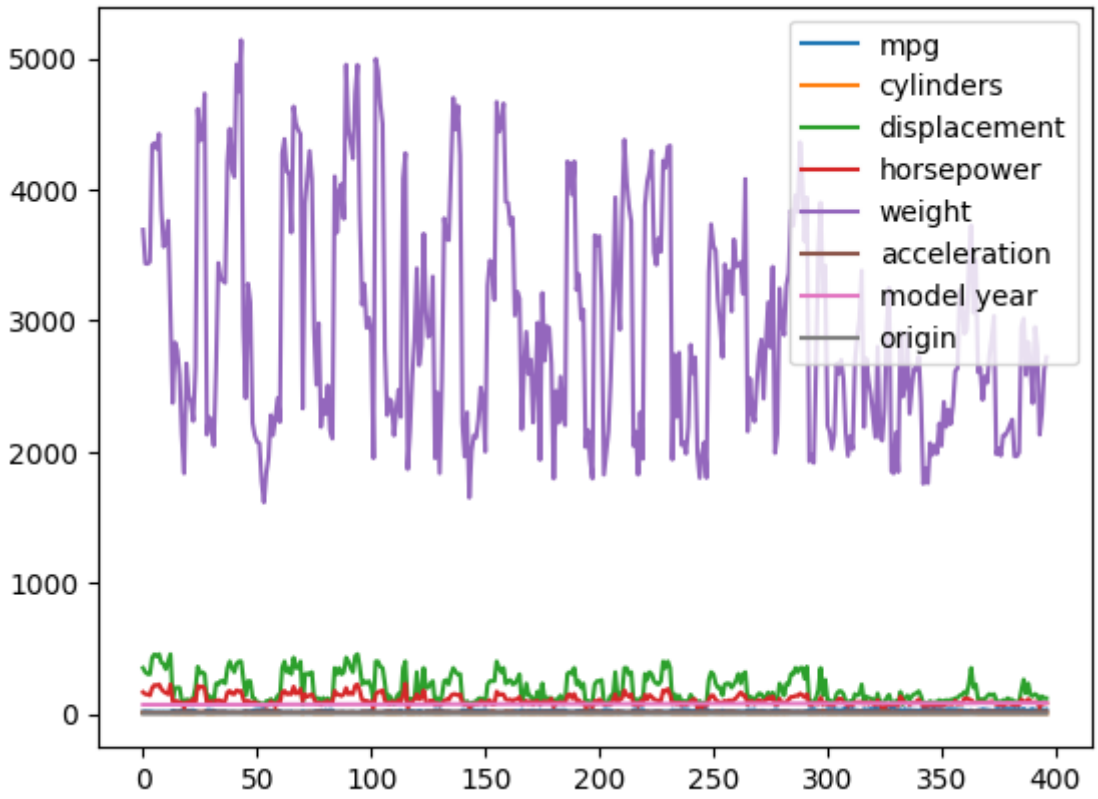
397 rows × 8 columns

In [8]:
```
print(data.head(5))
```

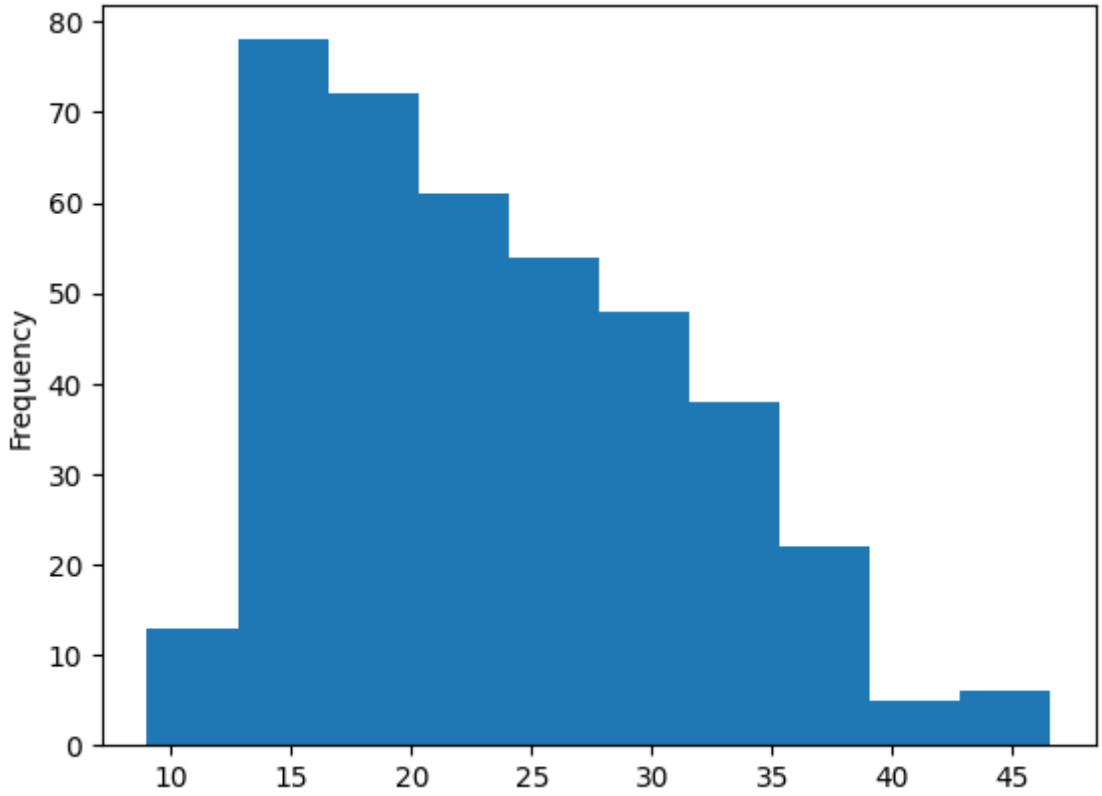
```
    mpg  cylinders  displacement  horsepower  weight  acceleration  \
0  15.0          8         350.0       165.0  3693.0          11.5
1  18.0          8         318.0       150.0  3436.0          11.0
2  16.0          8         304.0       150.0  3433.0          12.0
3  17.0          8         302.0       140.0  3449.0          10.5
4  15.0          8         429.0       198.0  4341.0          10.0

   model year  origin                car name
0          70       1   "buick skylark 320"
1          70       1  "plymouth satellite"
2          70       1       "amc rebel sst"
3          70       1         "ford torino"
4          70       1    "ford galaxie 500"
```

In [9]:
```
data.plot()
```

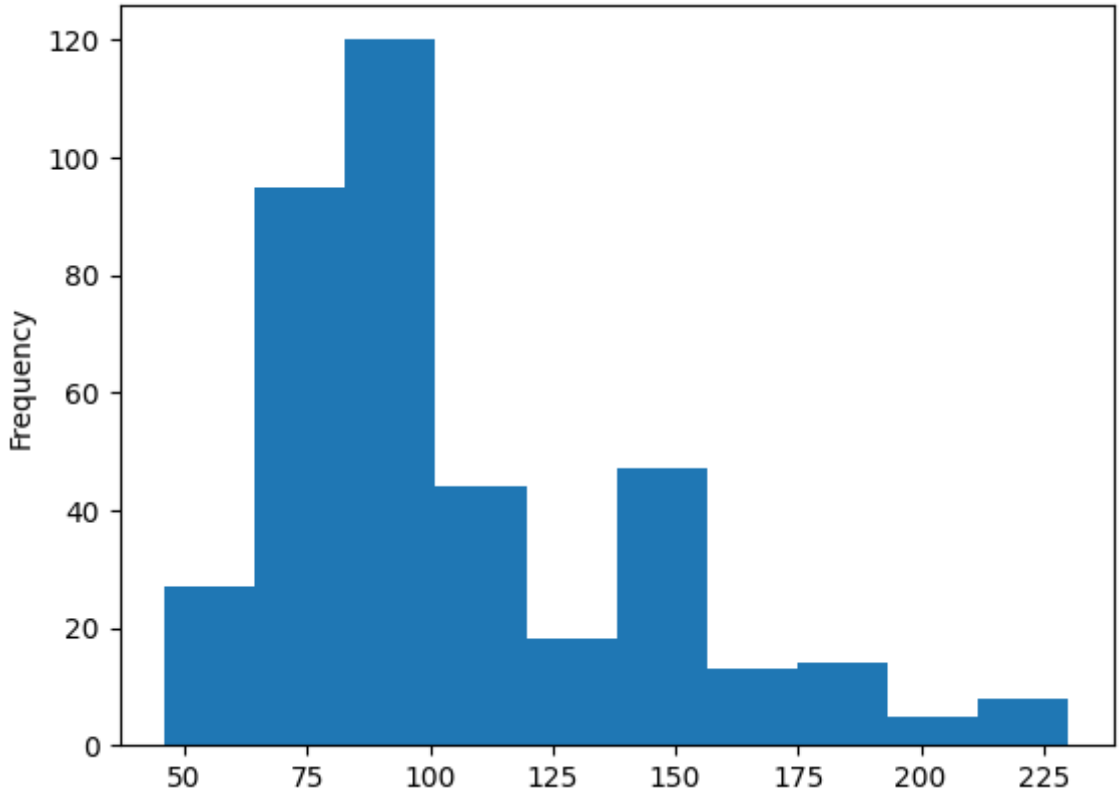
Out[9]: <AxesSubplot: >



In [10]:
```
data['mpg'].plot.hist();
```



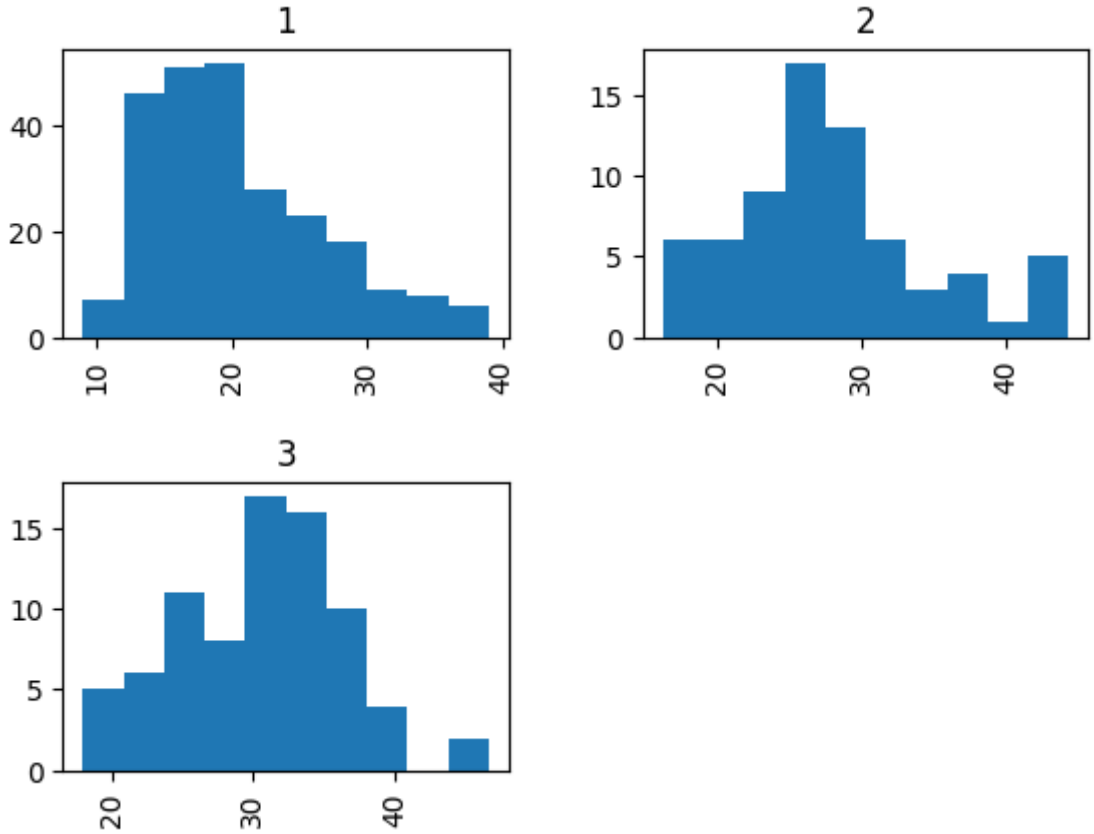
In [11]:
```
data['horsepower'].plot.hist();
```




In [12]:
```
data.origin.value_counts()
```

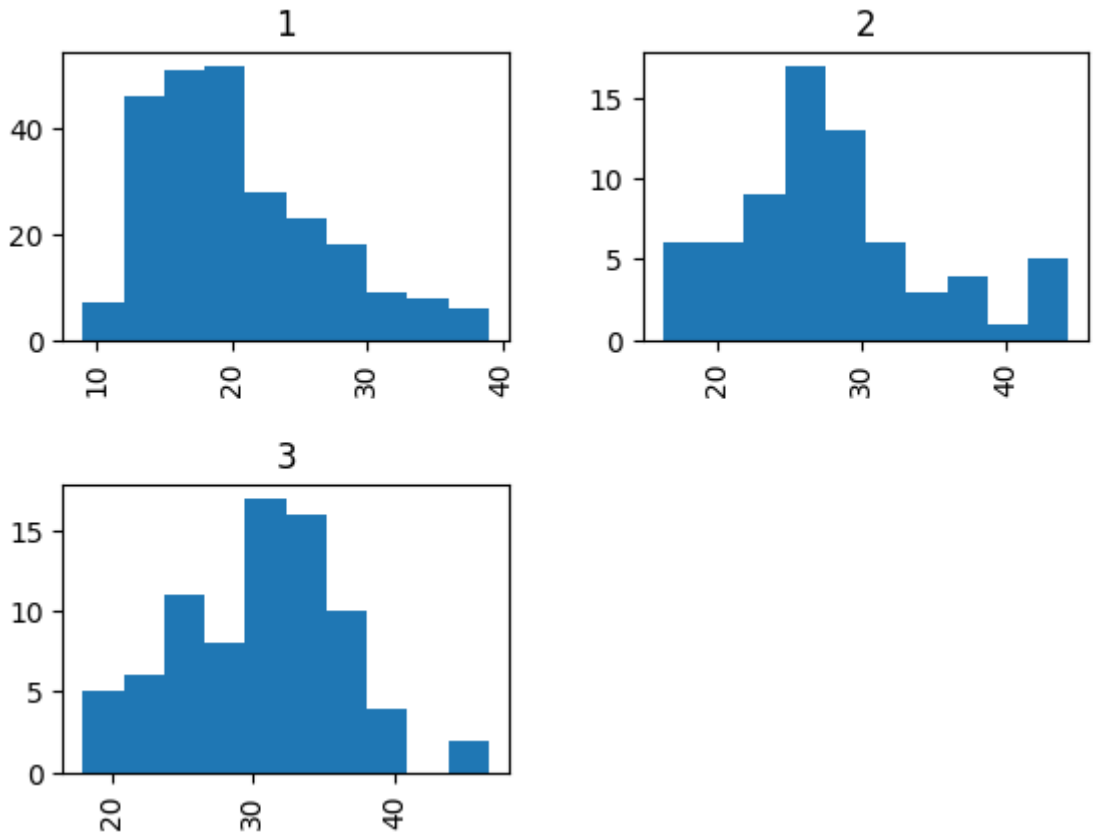
Out[12]:
```
1    248
3     79
2     70
Name: origin, dtype: int64
```

In [13]:
```
axs = data.hist(column='mpg', by='origin')
```

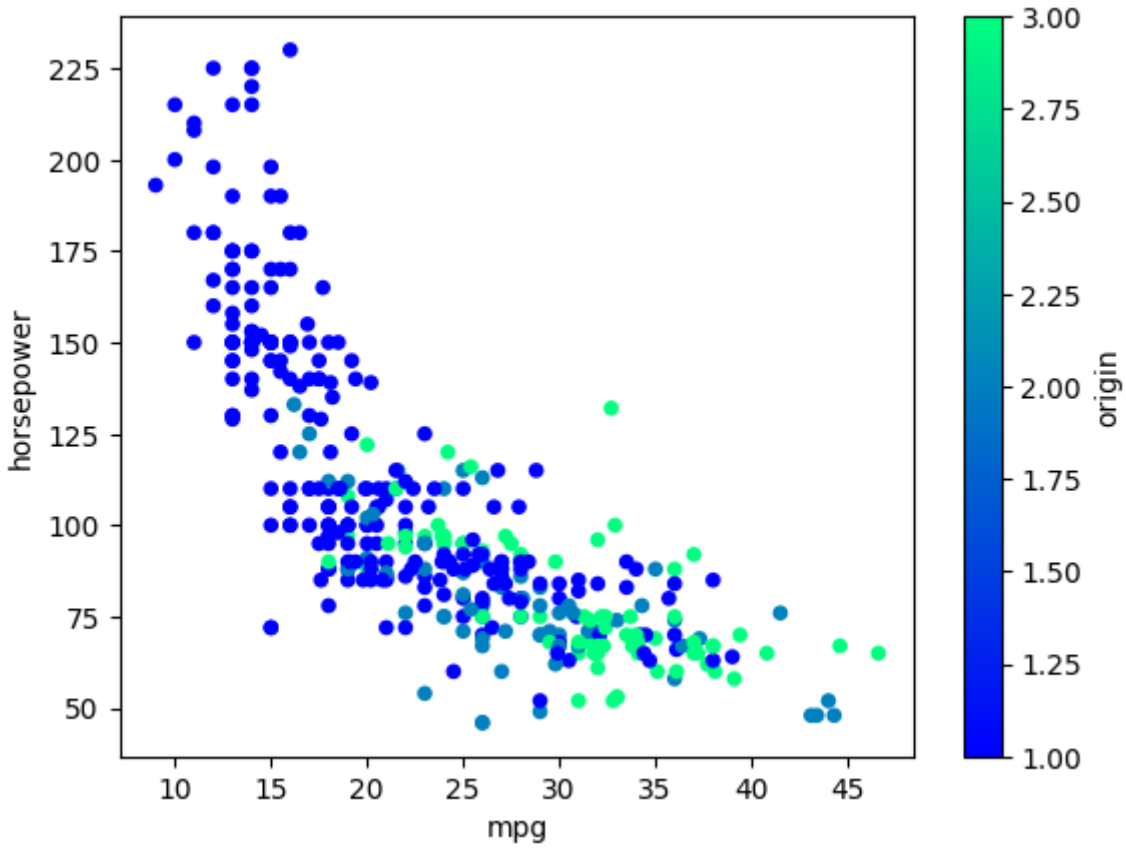


In [14]:
```
axs = data.hist(column='mpg', by='origin')
# axs[1].set(title='female', ylim=[0, 45])
# axs[2].set(title='male', ylim=[0, 45])
# axs[3].set(title='water', ylim=[0,45]);
```

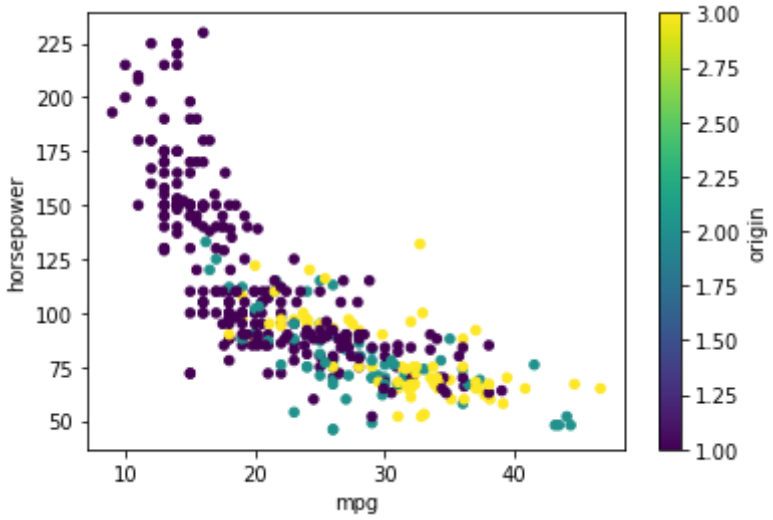
```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last
t)
Input In [14], in <cell line: 2>()
      1 axs = data.hist(column='mpg', by='origin')
----> 2 axs[1].set(title='female', ylim=[0, 45])
      3 axs[2].set(title='male', ylim=[0, 45])
      4 axs[3].set(title='water', ylim=[0,45])

AttributeError: 'numpy.ndarray' object has no attribute 'set'
```



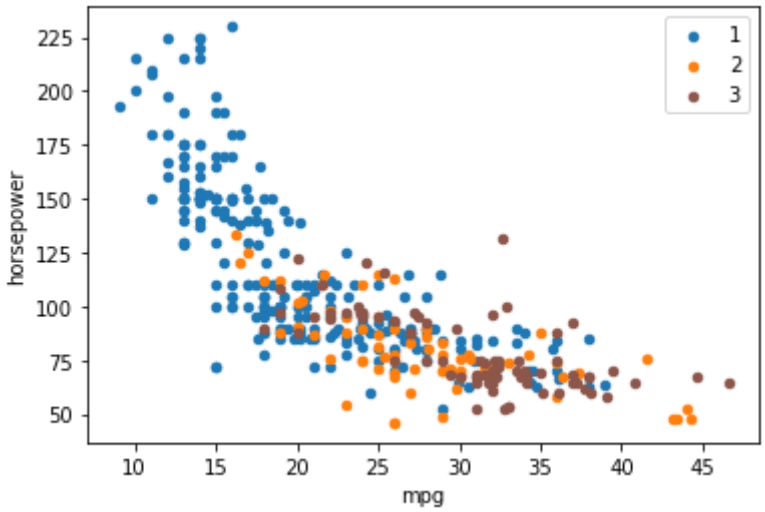
In [15]:
```
data.plot.scatter('mpg', 'horsepower', c='origin', colormap='winter');
```



In [132]:
```
fig, ax = plt.subplots()
data.plot.scatter('mpg', 'horsepower', c='origin', colormap='viridis', ax=a
```

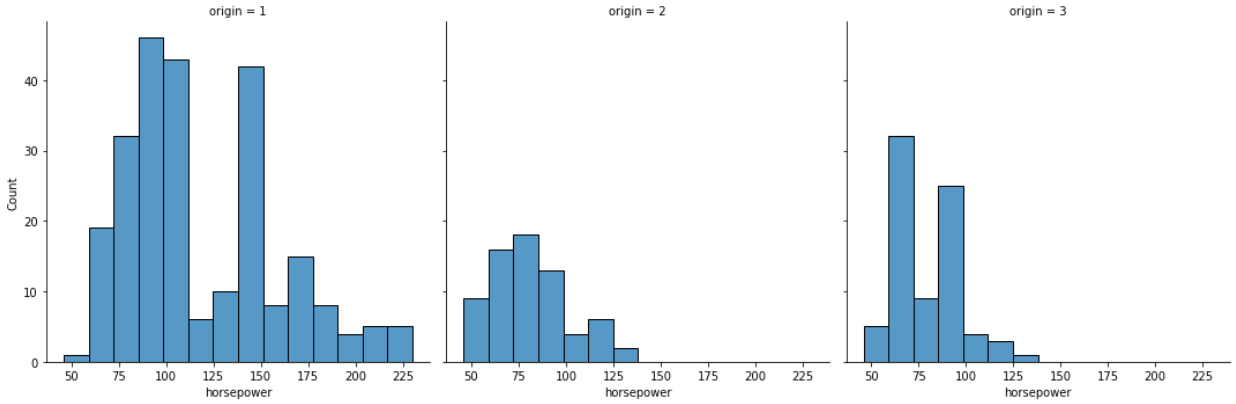



In [68]:
```
colors = {1: 'tab:blue', 2: 'tab:orange', 3: 'tab:brown'}
fig, ax = plt.subplots()
for key, group in data.groupby(by='origin'):
    group.plot.scatter('mpg', 'horsepower', c=colors[key], label=key, ax=ax
```

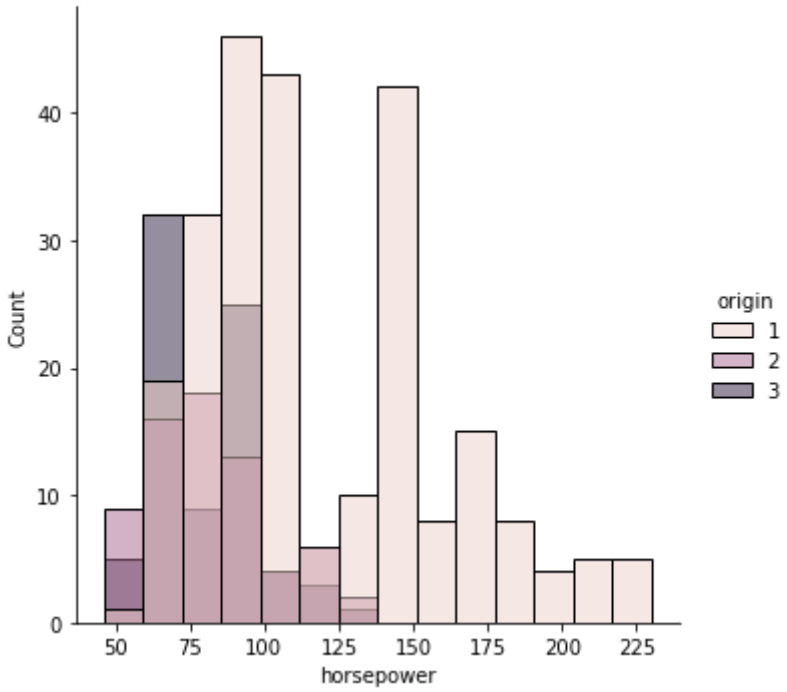



In [69]:
```
import seaborn as sns
```

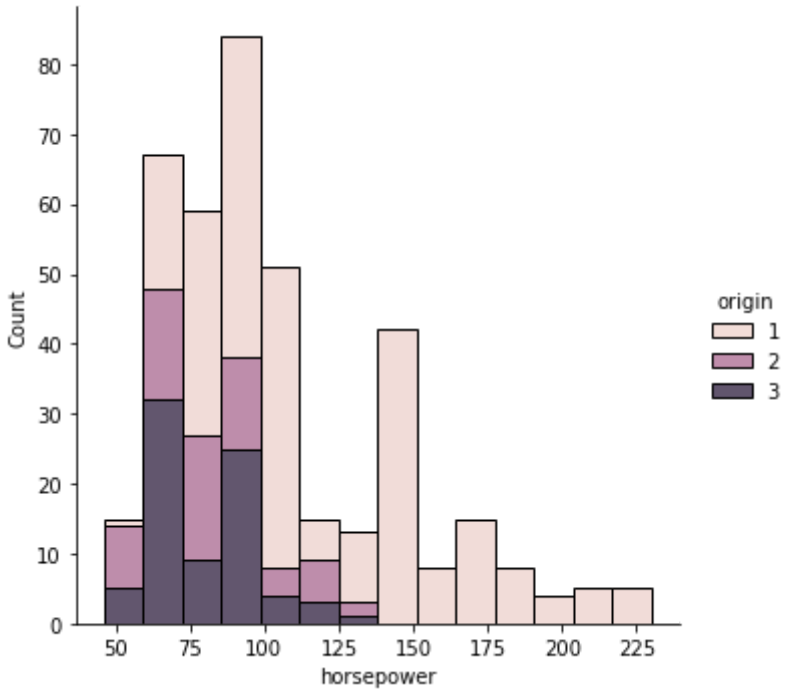
In [70]:
```
sns.displot(x='horsepower', col='origin', data=data);
```



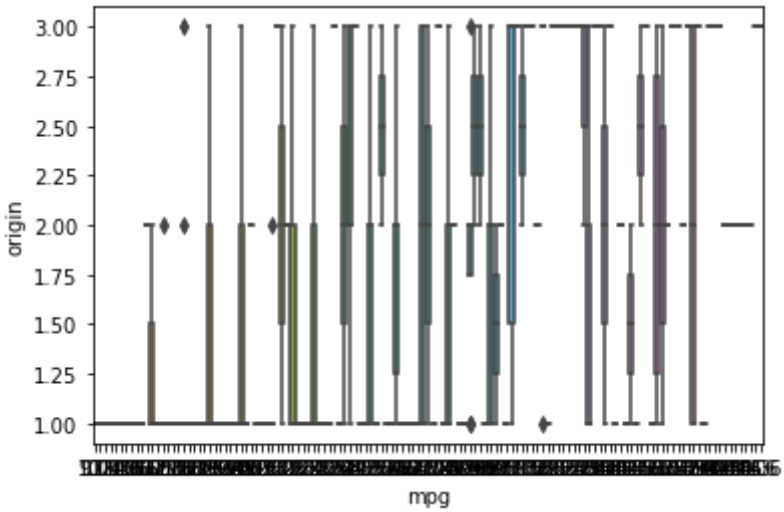

In [71]:
```
sns.displot(x='horsepower', hue='origin', data=data);
```



In [72]:
```
sns.displot(x='horsepower', hue='origin', data=data, multiple='stack');
```



In [74]:
```
sns.boxplot(x='mpg', y='origin', data=data);
```



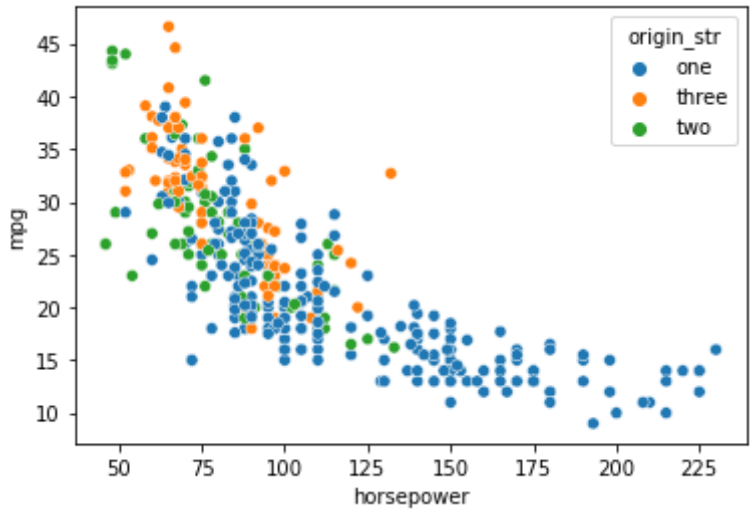
In [87]:
```
data['origin_str'] = data['origin'].replace([1,2,3], ['one', 'two', 'three'
data
```

Out[87]:

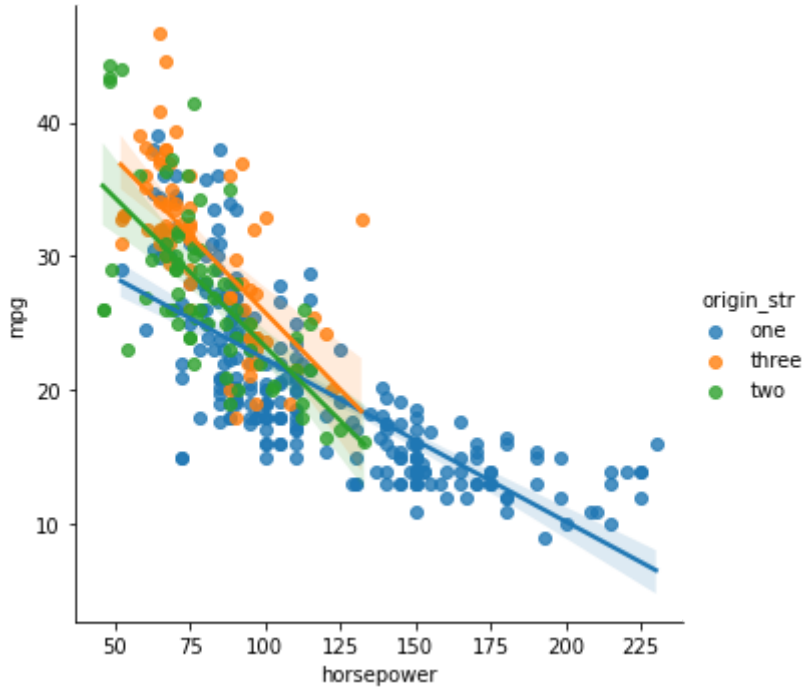
| | mpg | cylinders | displacement | horsepower | weight | acceleration | model year | origin | car name | ori |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 15.0 | 8 | 350.0 | 165.0 | 3693.0 | 11.5 | 70 | one | "buick skylark 320" | |
| **1** | 18.0 | 8 | 318.0 | 150.0 | 3436.0 | 11.0 | 70 | one | "plymouth satellite" | |
| **2** | 16.0 | 8 | 304.0 | 150.0 | 3433.0 | 12.0 | 70 | one | "amc rebel sst" | |
| **3** | 17.0 | 8 | 302.0 | 140.0 | 3449.0 | 10.5 | 70 | one | "ford torino" | |
| **4** | 15.0 | 8 | 429.0 | 198.0 | 4341.0 | 10.0 | 70 | one | "ford galaxie 500" | |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| **392** | 27.0 | 4 | 140.0 | 86.0 | 2790.0 | 15.6 | 82 | one | "ford mustang gl" | |
| **393** | 44.0 | 4 | 97.0 | 52.0 | 2130.0 | 24.6 | 82 | two | "vw pickup" | |
| **394** | 32.0 | 4 | 135.0 | 84.0 | 2295.0 | 11.6 | 82 | one | "dodge rampage" | |
| **395** | 28.0 | 4 | 120.0 | 79.0 | 2625.0 | 18.6 | 82 | one | "ford ranger" | |
| **396** | 31.0 | 4 | 119.0 | 82.0 | 2720.0 | 19.4 | 82 | one | "chevy s-10" | |

397 rows × 10 columns

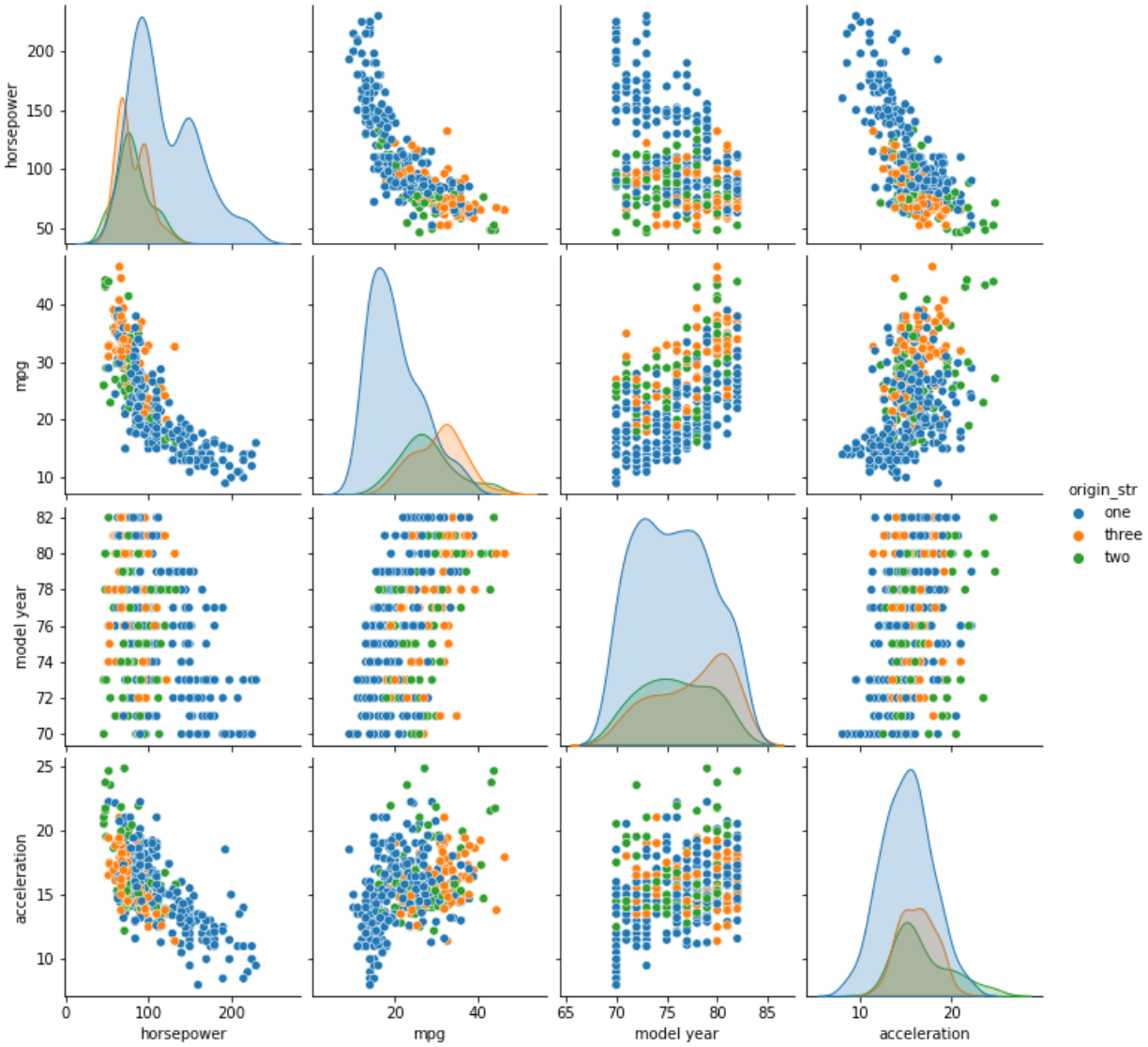
In [88]:
```
ax = sns.scatterplot(x='horsepower', y='mpg', data=data, hue='origin_str')
```



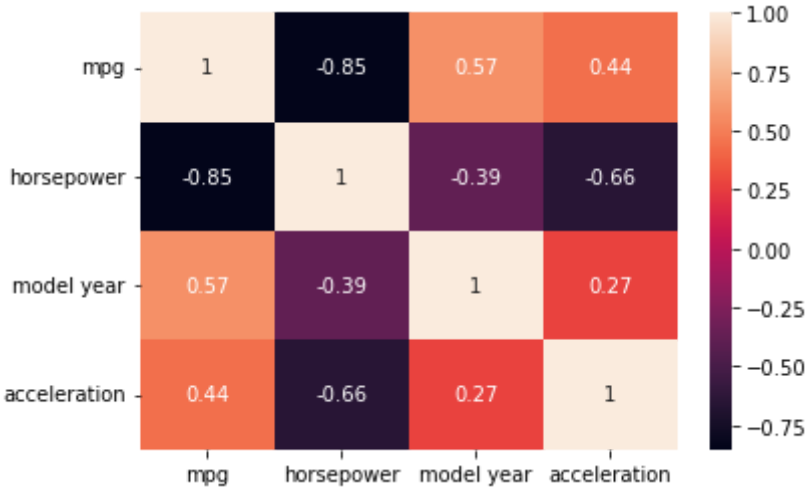

In [89]:
```
ax = sns.lmplot(x='horsepower', y='mpg', data=data, hue='origin_str')
```



In [90]:
```
sns.pairplot(data, vars=['horsepower', 'mpg', 'model year', 'acceleration']
```



In [91]:
```
g = sns.heatmap(data[['mpg', 'horsepower', 'model year', 'acceleration']].c
                annot=True)
```




In [1]:
```
conda env list
```

```
# conda environments:
#
base                     /Users/olusolaakinbode/opt/anaconda3
ensf592                  /Users/olusolaakinbode/opt/anaconda3/envs/ensf59
2
ensf611               *  /Users/olusolaakinbode/opt/anaconda3/envs/ensf61
1


Note: you may need to restart the kernel to use updated packages.
```

In [ ]:
```
```